

**ABSTRACT**

[0029] The present invention relates to a semiconductor device for production of a gas from a material comprising the gas using light as the sole power source. In an embodiment, the semiconductor comprises a substrate; a solid-state semiconductor layer disposed on the substrate; a photoactive semiconductor top layer further comprising a photoelectrochemical electrode junction; and an interface layer disposed between the solid-state semiconductor layer and the photoactive semiconductor top layer. A surface of the photoactive semiconductor top layer is exposed to both a source of light such as the sun and to the material, e.g. a liquid electrolyte. The gas is liberated from the material, e.g. hydrogen liberated from a liquid electrolyte. It is emphasized that this abstract is provided to comply with the rules requiring an abstract which will allow a searcher or other reader to quickly ascertain the subject matter of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims.